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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/846,255	05/02/2001	Satoshi Kikuchi	207224US0	6560

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EXAMINER

SCHILLINGER, LAURA M

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 07/17/2002

6

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/846,255

Applicant(s)

KIKUCHI ET AL

Examiner

Laura M Schillinger

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 02 May 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mehta ('102) as applied to claim 1 <sup>previously</sup> ~~above~~, and further in view of Verhaverbeke et al ('624).

In reference to claim 1, Mehta teaches a method comprising:

Bringing a mixed gas of anhydrous HF gas and a heated inert gas into contact with a substrate surface such that at least a portion of a low-density film is removed without impairing a high density film beyond a tolerance (Abs., Lines: 1-28).

However, Mehta fails to teach applicant's amended claim limitation by continuously exposing the anhydrous gas in contact with the substrate.

Verhaverbeke et al ('624) teaches that traditional HF vapor etching is performed in dynamic mode, which is a mode where the process gases are continuously forming (Col.2, lines: 1-15).

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It would have been obvious to one of ordinary skill in the art to modify Mehta's teachings to include a dynamic mode (continuous flow) of vapor etching as taught by Verhaverbeke because both Verhaverbeke and the applicant himself teach that the pulsing (static mode) or continuous flow (dynamic mode) may produce be used to selectively etch silicon oxides and further that the well known continuous flow of gases reduce processing times (See Verhaverbeke Col.3, lines: 40-50 and line:20; see also applicant's specification, specifically Page 45 lines: 1-20, comparing a pulsing (static mode) to continuous flow (dynamic mode)). Consequently, applicant's claim language does not overcome prior art and deemed to be FINAL.

In reference to claim 2, Mehta teaches wherein the high density film is necessary for the substrate and the low density film is not (Col.1, lines: 28-32).

In reference to claim 3, Mehta teaches wherein the low density film has impurities which are removed with the film (Abs., lines:20-28).

In reference to claim 4, Mehta teaches wherein the mixed gas further comprises steam (Col.2, lines: 50-60).

In reference to claim 5, Mehta teaches wherein the substrate is Si, the high density film is a thermal oxide film and the low density film is a natural oxide film formed on the substrate or an oxide film formed with a chemical solution (Abs., lines: 20-28 and Col.1, lines: 5-32).

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In reference to claim 6, Mehta teaches wherein the substrate is for a semiconductor device (Abs., lines: 18-25).

In reference to claim 7, Mehta teaches wherein the high density film is formed on the substrate via a substrate layer (Col.5, lines: 20-40).

In reference to claim 8, Mehta teaches wherein the mixed gas is maintained at a temperature between room temperature and 200 degrees C (Col.4, lines: 5-15).

In reference to claim 9, Mehta teaches wherein the mixed gas is maintained at a temperature between room temperature and 100 degrees C (Col.4, lines: 5-15).

In reference to claim 10, Mehta teaches wherein the surface of the substrate is between 30 and 50 degrees C (Col.4, lines: 10-15).

In reference to claim 11, Mehta teaches wherein the mixed gas has a flow rate between 40 to 60 L/min (col.4, lines: 15-25).

In reference to claim 12, Mehta teaches wherein the concentration of anhydrous HF gas is in the range of 1 vol. % to 3 vol. % (Col.4, lines: 25-30).

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In reference to claim 13, Mehta teaches wherein the concentration of anhydrous HF gas is in the range of 1.5 vol. % to 2 vol. % (Col.4, lines: 25-30).


***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M Schillinger whose telephone number is (703) 308-6425. The examiner can normally be reached on M-F 7:00 -4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

  
OLIK CHAUDHURI  
SUPERVISORY PATENT EXAMINER  
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